REMARKS

Claims 1, 2, 4-9, and 11-14 are pending in the subject application. Claim 1 has been amended. Support for the amendment to claim 1 may be found at page 16, line 15 through page 19, line 3 and Figures 1C and 1D; page 21 lines 3-10 and Figure 2 (particularly elements 11, 12, 13, and 14); and Figures 3C and 3D. No new matter has been introduced by the instant amendment. Favorable reconsideration in light of the amendments and remarks which follow is respectfully requested.

An English language translation of the Korean Office Action referenced in the August 5, 2002 Information Disclosure Statement is enclosed for the consideration of the Examiner. Thus Applicants respectfully submit that the IDS complies with all of the requirements of rule 37 CFR 1.98 including the provisions of rule 1.98(a)(3).

Claims 1-2, 4, 6-7, 9 and 11 were rejected under 35 U.S.C. §102(b) as being allegedly anticipated by Takada et al (U.S. Patent 4,629,681).

Claims 1-2, 4, 6-7, 9 and 11-14 have been rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Takada in view of JP 10-245,444 and Larsson (U.S. Patent 6,303,278 B1).

Claims 1-2, 4-7, 9 and 11 have been rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Takada in view of Iwasaki et al. (U.S. Patent 5,323,534).

Claims 1-2, 4, 6-7, 9, 11, and 15 have been rejected under 35 U.S.C. §103(a) as being allegedly unpatentable over Takada in view of Kishomoto et al (U.S. Patent 5,516,983).

For the sake of brevity, the four § 102 and § 103 rejections which rely upon the Takada reference are addressed in combination. Such a combined response is considered appropriate because *inter alia* each of the rejections relies on the Takada patent as the primary citation. Each of the rejections is traversed.

The present invention provides methods of forming a low-resistance metal film over a patterned ground resin film by a wet film formation technique such that the low-resistance metal film encloses the patterned ground resin film. For example, claim 1, as amended, provides a method of manufacturing metal wiring in which a low-resistance metal film is formed over a patterned polyimide ground resin film such that the patterned polyimide ground resin is enclosed by the low-resistance metal film. Thus, the metal film is deposited over the entirety of the patterned polyimide resin such that all of the polyimide resin is in contact with either the substrate or the low-resistance metal film. See, for example, Figure 1C, 1D, 3C, and 3D.

None of the cited documents, alone or in combination, teach or suggest a method of manufacturing a metal wiring in which a patterned ground resin layer is enclosed by a metal layer deposited over the resin layer.

Tanaka teaches a base substrate having a first conductive layer deposited on the substrate, an patterned insulator film, having holes opening to the first conductive layer is then deposited onto the substrate. Finally a second conductive layer is deposited into the opening of the insulator film which is in contact with the first conductive layer and only **partially** covers the insulating film. Tanaka neither discloses nor suggests a method of manufacturing metal wirings comprising: (1) depositing an insulator layer onto a substrate, (2) patterning the insulator layer, forming a low-resistance metal layer over the patterned insulator layer such that the insulator layer is enclosed by the low-resistance metal layer.

Tanaka neither discloses nor suggests depositing a metal layer onto a patterned insulating layer such that the metal layer encloses the insulating layer, e.g., the deposited metal layer coats all exposed surfaces of the insulating layer. Thus, Tanaka fails to teach or suggest the manufacturing methods provided by the present invention.

None of the secondary references, e.g., JP 10-245,444, Larsson, Iwasaki, Kishomoto or a combination thereof, overcome the limitations of the Tanaka reference.

As the office action is understood, JP 10-245,444 is relied on for the its alleged teaching of a metal layer formation by reduction of metal ions and surface modification using KOH. However, it appears that JP 10-245,444 teaches a method of forming a conductive coating on a polyimide substrate, the method comprising (1) sulfonating the polyimide, forming a metal sulfonate, and (3) reducing the metal sulfonate to form a metal film.

The '444 document neither discloses nor suggest patterning a ground resin layer or depositing a metal layer over the patterned ground resin layer such that the remaining ground resin layer is enclosed by the deposited metal layer. More particularly, JP 10-245,444 neither discloses nor suggests a method of fabricating a metal line or metal wire comprising forming a metal layer over a patterned ground resin film such that the metal layer encloses the ground resin film.

As the reference is understood, Larsson teaches a method of modifying a surface by grafting a composition to specified portions of the surface, absorbing metal ions onto the grafted composition and then depositing additional metal onto the grafted composition by traditional deposition techniques. More particularly, Larsson neither discloses nor suggests a method of fabricating a metal line or metal wire comprising a step of forming a metal layer over a patterned ground resin film such that the metal layer encloses the ground resin film.

Thus the combination of Tanaka, JP 10-245,444 and/or Larsson does not teach each step of the metal wiring fabrication method of the present invention.

As the reference is understood, Iwasaki merely teaches the incorporation of a plating catalyst into an epoxy adhesive layer. Iwasaki neither discloses nor suggests methods of wire fabrication comprising a step of forming a metal layer over a patterned ground resin film such that the metal layer encloses the ground resin film. Thus the combination of Tanaka and Iwasaki does not teach each step of the metal wiring fabrication method of the present invention.

As the reference is understood, Kishomoto is merely teaches various polyimide layer thicknesses. Kishomoto neither discloses nor suggests methods of wire fabrication comprising a step of forming a metal layer over a patterned ground resin film such that the metal layer encloses the ground resin film. Thus the combination of Tanaka and Kishomoto does not teach each step of the metal wiring fabrication method of the present invention.

Claim 1 is patentable over Tanaka in combination with JP 10-245,444, Larsson, Iwasaki, Kishomoto or a combination thereof. Claims 2, 4-9, 11-15 depend from claim 1 and are therefore also patentable over any combination of the teachings of Tanaka, JP 10-245,444, Larsson, Iwasaki, and Kishomoto.

Claims 1-2, 4-9 and 11-13 were rejected under 35 U.S.C. §102(b) as being allegedly anticipated by O'Sullivan et al (U.S. Patent 5,310,580).

The rejection is traversed.

As the reference is understood, O'Sullivan teaches a method comprising the steps of:
(1) Depositing a resin film;
(2) Roughening the resin surface by chemical etching; and
(3) Depositing a copper layer onto the roughened resin surface

Thus, the O'Sullivan neither discloses nor suggests methods of manufacturing a **metal wiring**. More particularly, the O'Sullivan reference neither discloses nor suggests patterning of a resin layer. As is known in the art, the term "patterning" generally refers to processes of transferring a two dimensional image onto a substrate surface and selectively removing a portion of the substrate to generate the image in the substrate. In contrast, O'Sullivan merely teaches random roughening of the surface of the resin layer.

Thus, claim 1 is patenable over O'Sullivan. Claims 2, 4-9 and 11-13 depend from claim 1 and are therefore also patentable over O'Sullivan.

Reconsideration and allowance of claims 1-15 is respectfully requested in view of the foregoing discussion. This case is believed to be in condition for immediate allowance. Applicant respectfully requests early consideration and allowance of the subject application.

If for any reason a fee is required, a fee paid is inadequate or credit is owed for any excess fee paid, you are hereby authorized and requested to charge Deposit Account No. 04-1105.

Should the Examiner wish to discuss any of the amendments and/or remarks made herein, the undersigned attorney would appreciate the opportunity to do so.

Respectfully submitted,

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